A Survey of Resident Nutrient Behavior in the Chesapeake Bay Watershed

Chris Swann
Center for Watershed Protection
Ellicott City, Maryland

In recent years a handful of communities have attempted to craft education programs to influence our watershed behaviors. These initial efforts have gone by a confusing assortment of names, such as public outreach, source control, watershed awareness, pollution prevention, citizen involvement, and stewardship, but they all have a common theme -- educating residents on how to live within their watershed.

Many communities will need to develop watershed education programs in the coming years to comply with pending EPA municipal stormwater NPDES regulations. Indeed, half of the six minimum management measures prescribed under these regulations directly deal with watershed education – pollution prevention, public outreach and public involvement. Yet, many communities have no idea what kind of message to send, or what media to use.

In the following presentation, we review the prospects for changing our behaviors to better protect watersheds. We begin by outlining some of the daunting challenges that face educators who seek to influence deeply rooted public attitudes. Next, we profile research on the outreach techniques that appear most effective in influencing watershed behavior. Special emphasis is placed on media campaignsand intensive training programs. Lastly, recommendations are made to enhance the effectiveness of watershed education programs.

Challenges in Watershed Education

Watershed managers face several daunting challenges when they attempt to influence watershed behaviors. Some of those challenges include:

A lot of minds to change

The most pressing challenge is that there are simply a lot of minds to change. Some notion of the selling job at hand can be grasped from Table 1, which contains provisional, but conservative, estimates of potential residential "polluters" in the United States by various categories. It is clear that we are attempting to change deeply rooted attitudes held by millions of people. While most people profess to support the environment, only a fraction actually practice much of a watershed ethic on the small parcels of the environment where they live.

Table 1. Provisional Estimates of Potential Residential Polluters in the United States

Watershed Behavior	Prevalence in Overall Population	Estimates of Potential Residential Polluters
Over-Fertilizers	35%	38 million
Bad Dog Walkers	**15%**	16 million
Chronic Car washers	25%	27 million
Septic Slackers	15%	16 million
Bad Mechanics	**1 to 5%**	3 million
Pesticide Sprayers	40%	43 million
Hosers	15%	16 million

Notes: estimates are based on 1999 U.S. population of 270 million, 2.5 persons per household, and average behavior prevalence rates based on numerous market surveys (See references).

Most Residents are Only Dimly Aware of the Watershed Concept.

It stands to reason that if citizens are asked to practice a watershed ethic, they will need to know what a watershed is. Surveys indicate, however, that the average citizen is unaware of the watershed concept in general, and does not fully understand the hydrologic connection between their yard, the street, the storm sewer, and (finally) local streams. Resident surveys also continue to show limited or incomplete understanding of terms such as "watershed", "stormwater quality" or "runoff pollution". For example, a recent Roper survey found that only41 % of Americans had any idea of what the term watershed meant (NEETF, 1999). The same survey found that just 22% of Americans know that stormwater runoff is the most common source of pollution of streams, rivers, and oceans.

At the same time, most of us claim to be very environmentally aware. For example, a Chesapeake Bay survey reported that 69% of respondents professed to be very active or at least somewhat active in helping to reduce pollution in the environment (SRC, 1994).

Resources Devoted to Watershed Education are Inadequate.

In recent years, several communities have developed education programs to influence the watershed behaviors practiced by their residents. Most of these efforts, however, are run on a shoestring. For example, CWP recently surveyed 50 local programs that have tried to influence lawn care, septic cleaning and pet waste behaviors (Swann, 1999). These education programs are typically run by the cooperative extension services, local recycling or stormwater agencies, or urban soil and water conservation districts. Most are poorly staffed (0.1 to 0.5 staff years), relatively new (within last five years), and have tiny annual budgets ($2,000 to $25,000). Given these limited resources, most watershed education programs have no choice but to practice retail, rather than wholesale, outreach techniques. Consequently, most watershed educators rely heavily on low-cost techniques such as brochures, posters, workshops, and demonstration projects to send their message out.

The Marketing Techniques We Can Afford Don't Reach Many People

Watershed managers need to send a clear and simple educational message that can attract the attention of the average citizen who is simultaneously bombarded by dozens of competing messages every day. A number of surveys have asked residents which outreach techniques are most influential in attracting their attention (Table 2). Messages sent through television, radio and local newspapers are consistently more influential in reaching residents than any other technique, with up to 30% recall rates by the watershed population for each technique. By contrast, messages transmitted through meetings, brochures, local cable and videos tend to be recalled by only a very small segment of the watershed population.

Table 2. Most Influential Methods of Getting Messages to Citizens, in 8 Citizen Surveys

	WA (Elgin, 1996)	OR (AMR,1997)	CA (As-sing, 1994)	CA (Pellegrin, 1998)	MI (PSC, 1994)	WI (Simpson, 1994)	MN (Morris et al., 1996)
TV	TV ad	Direct Mail	TV Ad	TV	TV	TV	Newspaper
TV ad	TV	TV ad	Stencils	Paper	Paper	Paper	Direct Mail
Newspaper	Newspaper	Newspaper	Billboard	Radio	Cable TV	Newsletter	TV
Local paper	Radio Ad	Radio	Local paper	Magazine	Local paper	Brochure	Neighbors
Video	Brochure	TV	Brochure	Neighbors	News-letter	Site Visit	Ext Service
Brochure	Radio news	Bill Insert	Radio Ad	School	Video	Video	Radio
Local cable	Paper Ad	Newsletter	Bus Sign	Billboard	Meetings	Meeting	Meeting
Meeting	Billboard	Local paper	Direct Mail	Brochure	Brochure	—	Local cable

One clear implication is that watershed education efforts must utilize a mix of outreach techniques if they are going to get the message across to enough residents to make a difference in a watershed. Most existing watershed education programs, however, cannot afford to use the more sophisticated *wholesale* outreach techniques that are most effective

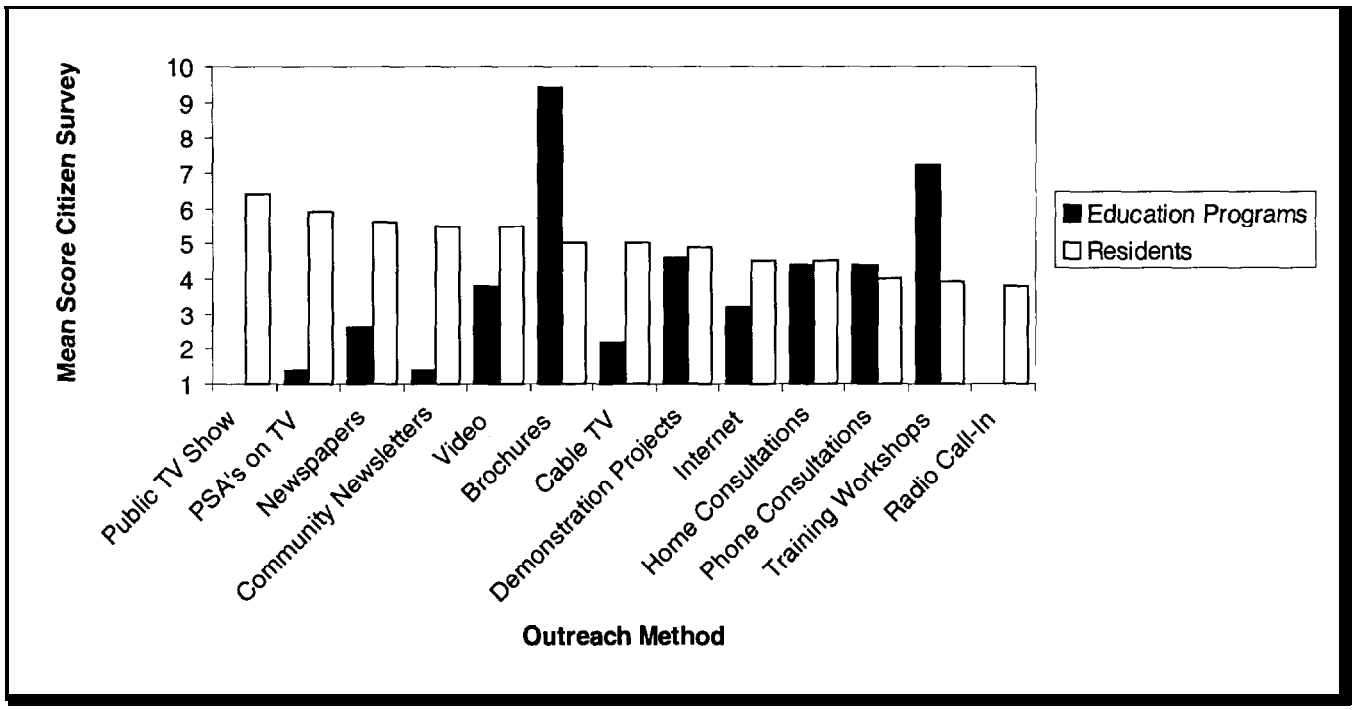

Figure 1. Outreach Methods Preferred By Residents Compared to Those Used by Education Programs.

at reaching the public with their watershed message. This gap is evident in Figure 1, which compares the outreach methods actually used by local watershed education programs with the outreach methods that residents prefer, based on responses from the Chesapeake Bay survey (Swann, 1999).

Crafting Better Watershed Education Programs

The first step in crafting better watershed education programs is to compile some baseline information on local awareness, behaviors and media preferences. Some of the key questions watershed managers should consider are:

Is the typical individual **aware** of water quality issues in the watershed they live in?

. Is the individual or household **behavior** directly linked to **water quality problems ?**

▸ Is the behavior widely prevalent in the watershed **population ?**

▸ Do specific **alternative(s)** to the **behavior** exist that might reduce pollution?

▸ What is the most clear and direct **message** about these alternatives?

▸ What **outreach** methods are most effective in getting the message out ?

▸ How much **individual behavior change** can be expected from these outreach techniques?

The best way to elicit this information is to conduct a market survey within the watershed. These market surveys are useful for two purposes: to gauge the level of watershed awareness and interest within the general population, and to determine if there is a segment of the population where education efforts should be focused to achieve the best returns in behavioral changes for the money spent.

Perhaps the most critical step in crafting an education program is to select the right outreach techniques to send the watershed message. Several communities have recently undertaken before and after surveys to measure how well the public responds to their watershed education programs. From this research, two outreach techniques have shown some promise in actually changing behavior -- media campaigns and intensive training. Media *campaigns* typically use a mix of radio, TV, direct mail, and signs to broadcast a general watershed message to a large audience. *Intensive training* use workshops, consultation and guidebooks to send a much more complex message about watershed behavior to a smaller and more interested audience. Intensive training often requires a time commitment of several hours from residents.

Both media campaigns and intensive training can produce up to a 20% improvement in selected watershed behaviors among their respective target populations (Tables 3 and 4). Both outreach techniques are probably needed in most watersheds, as each complements the other. For example, media campaigns cost just a few cents per watershed resident reached, while intensive training can cost a few dollars for each resident that is actually influenced. Media campaigns are generally better at increasing watershed awareness, and sending messages about negative watershed behaviors. Intensive training, on the other hand, is superior at changing individual practices in the home, lawn and garden.

Table 3. Effectiveness of Media Campaigns in Influencing Watershed Behaviors: Four Surveys

Location and Nature of Targeted Campaign	Effectiveness of Campaign
San Francisco Radio, TV and Buses (BHI, 1997)	Awareness increased 1 O-l 5% Homeowners who reduced lawn chemicals shifted from 2 to 5%
Los Angeles Radio and Newspapers (Pellegrin Research Group, 1998)	Best recall: motor oil and litter (over 40%) Worst recall: fertilizer and dog droppings (<10 %) Drop in car washing, oil changing, radiator draining of about 5 to 7% Greater self-reporting of polluting behaviors: dropping cigarette butts, littering, watering and letting water run on street, hosing off driveways into the street (10% or more)
Oregon Radio, TV (Advanced Marketing Research, 1997)	19% reported a change in "behaviors"-changes included being more careful about what goes down drain, increasing recycling and composting, using more nature-friendly products etc.
Oakland County, MI Direct Mail (Public Sector Consultants, 1994)	44% of mail respondents recalled lawn care campaign 50% desired more information on lawn care and water quality 10% change in some lawn care practices as a result of campaign (grass recycling, fertilizer use, hand weeding). No change in other lawn care practices as a result of campaign

Table 4. Effectiveness of Intensive Training in Changing Watershed Behaviors

Location and Nature of Training Campaign	Effectiveness of Intensive Training
Maryland Direct Homeowner (Smith, 1996)	10% shift from self to commercial car washing. No change in fertilizer timing or rates. Better claims of product disposal.
Florida Master Gardener (Knox, 1995)	No significant change in fertilization frequency after program. Some changes in lower rates, labels, slow release (8 to 15%). Major changes in reduced pesticide use (10 to 40%).
Virginia Master Gardener (Aveni, 1998)	30 to 50% increase in soil testing, fertilizer timing and aeration. 10% increase in grass clippings and 10% decrease in fertilizer rate.

Both techniques work best when they present a simple and direct watershed message, are repeated frequently, utilize multiple media and are directly connected to local water resources that are most important in the community.

Other important suggested considerations for effectively marketing a watershed message are to:

Develop stronger connections among the yard, the street, the storm sewer, and the stream. Outreach techniques should continually stress the link between a particular watershed behavior and the undesirable water quality it helps to create (i.e., fish kills, beach closure, algae blooms). Several excellent visual ads that effectively portray this link are profiled in our watershed outreach award winners.

Form regional media campaigns. Since most communities operate on small budgets, they should consider pooling their resources to develop regional media campaigns that can use the outreach techniques that are proven to reach and influence residents. In particular, regional campaigns allow communities to hire the professionals needed to create and deliver a strong message through the media. Also, the campaign approach allows a community to employ a combination of media, such as radio, television, and print, to reach a wider segment of the population. It is important to keep in mind that since no single outreach technique will be recalled by more than 30% of the population at large, several different outreach techniques will be needed in an effective media campaign.

Use television wise/y. Television is the most influential medium for influencing the public, but careful choices need to be made on the form of television that is used. Our surveys found that community cable access channels are much less effective than commercial or public television channels. Program managers should consider using cable network channels targeted forspecificaudiences, and develop thematicshows that capture interest of the home, garden and lawn crowd (i.e., shows along the lines of “This Old Watershed”). Well-produced public service announcements on commercial television are also a sensible investment.

Understand the demographics of your watershed. The middle-aged male should usually be the prime target for watershed education, as he is prone to engage in more potentially polluting watershed behaviors than other sectors of the population. Indeed, the most important audience for the watershed message includes men in the 35 to 55 year age group with higher incomes and education levels. Specialized outreach techniques can appeal to this group, such as radio ads on weekend sports events.

Another target group worth reaching includes what Pellegrin (1998) terms the “rubbish rebels”-- 18 to 25 year olds who tend to have low watershed awareness, engage in potentially polluting behaviors, and are often employed in lawn care and other service industries. This age group is hard to reach using conventional techniques, but may respond to ads on alternative radio, concerts, and other events that celebrate the watershed.

As communities become more diverse, watershed managers should carefully track the unique demographics of their watersheds. For example, if many residents speak English as a second language, outreach materials should be produced in other languages. Similarly, watershed managers should consider more direct channels to send watershed messages to reach particular groups, such as church leaders, African American newspapers, and Spanish-speaking television channels.

Watershed educators should also be careful about using the traditional environmental education model that uses schools to educate children who in turn educate their parents. While this model was instrumental in achieving greater rates of recycling, it may not be as effective in changing watershed behaviors. While it is important to educate the next generation of fertilizers, dog walkers, septic cleaners, and car washers, we need to directly influence the “boomer’ generation now.

Keep the watershedmessagesimpleandfunny. Watershed education should not be preachy complex, or depressing. Indeed, the most effective outreach techniques combine a simple and direct message with a dash of humor.

Make information packets small, slick, and durable. Watershed educators should avoid the ponderous and boring watershed handbook that looks great to a bureaucrat but ends up lining the bottom of a bird cage. One solution is to create small, colorful and durable packets that contain the key essentials about watershed behaviors, with contact

information to get better advice. These packets can be stuck on the refrigerator, the kitchen drawer or the workbench for handy reference when the impulse for better watershed behavior strikes.

Educate *private sector allies.* A wide number of private sector companies may potentially stand to benefit from changes in watershed behavior. Better watershed behavior can drum up more sales for some companies, such as septic tank cleaners, commercial car washes, and quick oil change franchises -- although they may need some help in crafting their watershed marketing pitch.

Clearly, the potential exists for lawn care companies and landscaping services to shift their customers toward more watershed-friendly practices. Nationally, lawn care companies are used by up to 50% of consumers, depending on household income and lot size. Lawn care companies can exercise considerable authority over which practices are applied to the lawns they tend, as long as they still produce a sharp looking lawn. For example, 94% of lawn care companies reported that they had authority to change practices, and that about 60% of their customers were "somewhat receptive to new ideas" according to a Florida study (Israel et al, 1995). De Young (1997) also found that suburban Michigan residents expressed a high level of trust in their lawn care company.

Indeed, a small, but growing proportion of lawn care companies feel that environmental advertising makes good business sense and can increase sales (Israel et al, 1995). Clearly, intensive training and certification will be needed to ensure that watershed-friendly ads reflect good practice and not just slick salesmanship. It needs to be acknowledged that lawn care companies strongly committed to practices that reduce fertilizer and pesticide inputs need to be strongly endorsed by local government. Right now, it is not likely that such companies would be selected by the average consumer, as consumers primarily rely on direct mail, word of mouth, and cost when choosing a lawn care company (Swann, 1999 and AMR, 1997). For example, in the Chesapeake Bay survey, only two percent of residents indicated that they had chosen a lawn care company primarily on the basis that it was "environmentally friendly" (Swann, 1999).

Lawn and garden centers are another natural target for watershed education. Study after study indicates that product labels and store attendants are the primary and almost exclusive source of lawn care information for the average consumer. At first glance, national retail chains should be strongly opposed to better watershed behavior, since it would sharply cut into lawn and garden product sales and the lucrative profits they produce (even at the expense of the community and environmentally friendly image they often market). The key strategy is to substitute watershed-friendly products for ones that are not, and to offer training for the store attendants at the point of sale on how to use such products.

Summary

For the watershed manager faced with new regulatory requirements under Phase II of the NPDES program, the creation of an effective watershed education program should be a high priority. Not only is public education a mandated component of an NPDES permit, but in urbanized areas it may the most cost-effective tool available to achieve water quality goals. For smaller communities with scant budget and staff resources, it is imperative that these education programs be productive in terms of changing behaviors and raising awareness of individual actions on local water quality.

Perhaps the most important factor in creating an effective watershed education program is selecting the right outreach methods. Market surveys will often answer questions regarding the level of environmental awareness of watershed residents, what forms of informational outreach attract their attention, and resident willingness to change pollutant producing behaviors. This information allows the watershed manager to tailor outreach methods to specific target groups where behavior change is most likely. These surveys will also establish the demographics of the residents and determine whether multilingual outreach is required.

Watershed managers should also consider innovative approaches to sending out their pollution reduction messages. Pooling resources with other communities to create regional media campaigns and the use of outreach opportunities through private sector education are just two ways that program managers can reach broader audiences without spending large amounts of money.

Continued development of productive outreach methods and innovative techniques is necessary to relay the basic premise of watershed education - that we live in a watershed and how to properly live within it - in the most economical and effective manner.

References

Advanced Marketing Research (AMR). 1997. Stormwatertracking study. City of Eugene, Oregon. Unpublished marketing survey.

Assing, J. 1994. Survey of public attitudes. February and July, 1994. Russian Hill Associates. Alameda County Urban Runoff Clean Water Program. San Francisco CA. 84 pp.

Aveni, M. 1998. Water-wise gardener program: summary report. Unpublished Data. Virginia Cooperative Extension. Prince William County, VA.

Big Honking Ideas, Inc (BHI). 1997. Final report: Spring regional advertising campaign. Prepared for Bay Area Stormwater Management Agencies Association. Oakland, CA.

De Young, R. 1997. Healthy lawn and garden survey: data analysis report. Rouge River National Wet Weather Demonstration Project. Oakland County, Ml. 40 pp.

Elgin DDB. 1996. Public awareness study: summary report. The Water Quality Consortium. Seattle, WA. 24 pp.

Israel, G., S. Pinheiro and G. Knox. 1995. Environmental landscape management -- assessing practices among commercial groups. University of Florida. Cooperative Extension Service. Bulletin 307. Monticello, FL. 18 pp.

Knox, G., A. Fugate and G. Israel. 1995. Environmental landscape management--use of practices by Floridaconsumers. University of Florida Cooperative Extension Service. Bulletin 307. Monticello, FL. 26 pp.

Morris, W. and D. Traxler. 1996. Dakota County subwatersheds: residential survey on lawn care and water quality. Dakota County, Minnesota, Decision Resources, Ltd.

National Environmental Education Training Foundation (NEETF). 1999. National Report Card on Environmental Knowledge, Attitudes and Behaviors: Seventh Annual Roper Survey of Adult Americans. National Environmental Education Training Foundation, Washington, D.C.

National Service Research (NSR). 1998. Pesticide usage and impact awareness study: executive summary. City of Forth Worth Water Department. Fort Worth Texas. 44 pp.

Pellegrin Research Group. 1998. Stormwater/urban runoff public education program: interim evaluation, resident population. Los Angeles County Department of Public Works. 28 pp.

Public Sector Consultants, Inc (PSC). 1994. A strategy for public involvement. Rouge River National Wet Weather Demonstration Project. 56 pp.

Simpson, J. 1994. Milwaukee survey used to design pollution prevention program. Technical Note 37. *Watershed Protection Techniques. 1(3):133-I* 34.

Smith, J. 1996. Public survey used to estimate pollutant loads in Maryland. Technical Note 73. *Watershed Protection Techniques.* 2(2): 361-363.

Survey Research Center (SRC). 1994. The Chesapeake Bay attitudes survey. Communications subcommittee. Chesapeake Bay Program. U.S. Environmental Protection Agency. 42 pp.

Swann, C. 1999. A survey of residential nutrient behaviors in the Chesapeake Bay. Widener-Burrows, Inc. Chesapeake Research Consortium. Center for Watershed Protection. Ellicott City, MD. 112 pp.